IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

ARIGNA TECHNOLOGY LIMITED,	§	
	§	
Plaintiff,	§	
	§	
v.	§	Case No. 2:22-CV-00126-JRG-RSP
	§	
NISSAN MOTOR COMPANY, LTD., ET AL.,	§	
	§	
Defendants.	§	

CLAIM CONSTRUCTION OPINION AND ORDER

In this patent case[1], Plaintiff Arigna Technology Limited asserts U.S. Patent 7,397,318 (the "'318 Patent") against Defendants Nissan Motor Company, Ltd., Nissan North America, Inc., Tesla, Inc., Tesla Motors TX, Inc., Toyota Motor Corporation, Toyota Motor North America, Inc., General Motors LLC, ADC Automotive Distance Control Systems GmbH, Conti Temic Microelectronic GmbH, and Continental AG. The '318 Patent relates to "a voltage-controlled oscillator capable of easily correcting variation in oscillation frequency with temperature." '318 Patent at 3:7–11.

The parties dispute the scope of two claim terms: "connected to" and "grounded." The '318 Patent has only two claims, and each of these terms appears in both claims. Having considered the parties' briefing and arguments of counsel during a January 21, 2022 hearing, the Court resolves the disputes as follows.

[1] On April 27, 2022, the Court entered an Order severing the Defendants from the original action, *Arigna Technology Limited v. Volkswagen Group of America, Inc. et al*, No. 2:21-cv-00054-JRG-RSP, Dkt. No. 467 (E.D. Tex. April 27, 2022) (hereinafter "-054 Action"). All of the Defendants in this case signed onto the claim construction briefing filed by the Defendants in the -054 Action and were represented at the claim construction hearing in the -054 Action. Therefore, the Court enters this Claim Construction Opinion and Order in this case. Additionally, all references to Docket Numbers are with respect to the -054 Action.

I. BACKGROUND

The ’318 Patent relates to an improved voltage-controlled oscillator (VCO), which is an electronic circuit that outputs an oscillation frequency dependent on the magnitude of the input control voltage. As the input voltage increases, the oscillation frequency increases, and, as the input voltage decreases, the oscillation frequency decreases. *See, e.g.*, ’318 Patent Figs. 4–5 (showing a conventional VCO and the relationship between applied voltage and oscillator frequency).

The ’318 Patent describes one problem with conventional VCOs as variations of the output frequency with temperature, which results from the effect of temperature changes on transistors. Typically, an increase in temperature will cause a corresponding decrease in output frequency, and vice versa. *Id.* Fig.5. VCOs, however, can compensate for these variances in a number of ways. For example, the VCO shown in Fig. 4 includes a frequency control bias terminal (8) to which a voltage can be applied to compensate for the frequency variation caused by temperature change. *See id.* at 1:37–47. Similarly, the VCO shown in Fig. 6 changes the voltage across the variable capacitor (6) with a separate circuit (22) to adjust the oscillation frequency. *See id.* at 2:21–31.

But according to the patent, each of these solutions has its own problems. The prior-art solution of Fig. 4 must “apply a frequency control in a complicated way according to temperature.” ’318 Patent at 1:52–53. The solution of Fig. 6 results in increased phase noise. *See id.* at 2:46–51.

To address these problems, the ’318 Patent teaches how to easily correct variations in oscillation frequency with temperature. *Id.* at 3:6–11. As shown in Fig. 1, the first embodiment is structured almost identically to the prior art of Fig. 6, except the collector (rather than the emitter) side of the transistor is grounded, and the bias application terminal (17) is on the emitter (rather than the collector) side. Thus, the voltage at the collector (i.e., point X) is negative in Fig. 1, instead

of positive as in Fig. 6.

The embodiment shown in Fig. 3 is similar to that of Fig. 6, but with an additional diode (18) and resistor (19). The diode's anode is directly connected to the collector of transistor (11) and the cathode is directly connected to one end of resistors (10, 19), which is also Point X. When the temperature rises, the collector current of transistor (11) increases, which increases the voltage drop across resistor (12). The voltage at Point X is thereby reduced, which adjusts the oscillation frequency accordingly. *See generally id.* at 5:55–6:22.

The patent has only two claims. Each claim includes both disputed terms (italicized below) as part of the required "temperature compensation bias generation circuit." Claim 1, which is directed to the embodiment of Fig. 1, recites:

> 1. A voltage-controlled oscillator comprising:
> . . .
> a temperature compensation bias generation circuit which generates the temperature compensation bias and supplies the temperature compensation bias generated to the temperature compensation bias circuit, the temperature compensation bias generation circuit having:
> a transistor having a collector or drain *connected to* the temperature compensation bias circuit, a base or a gate, and an emitter or a source;
> a first resistor having a first end *connected to* the collector or drain of the transistor and having a second end that is *grounded*;
> a second resistor having a first end *connected to* the base or gate of the transistor;
> a base or gate bias application terminal *connected to* the other end of the second resistor;
> a third resistor having a first end *connected to* the emitter or source of the transistor; and
> an emitter or source bias application terminal *connected to* the other end of the third resistor.

'318 Patent at 6:5–7:16 (emphasis added). Similarly, Claim 2, which is directed to the embodiment shown in Fig. 3, recites:

2. A voltage-controlled oscillator comprising:
   . . .
   a temperature compensation bias generation circuit which generates the temperature compensation bias and supplies the temperature compensation bias generated to the temperature compensation bias circuit, the temperature compensation bias generation circuit having:
      a diode having a cathode *connected to* the temperature compensation bias application circuit;
      a transistor having a collector or drain *connected to* the anode of the diode, a base or a gate, and an emitter or a source;
      a first resistor having a first end *connected to* the collector or drain of the transistor; a collector or drain bias application terminal connected to a second end of the first resistor;
      a second resistor having a first end *connected to* the base or gate of the transistor;
      a base or gate bias application terminal *connected to* a second end of the second resistor;
      a third resistor having a first end *connected to* the emitter or source of the transistor and having a second end that is *grounded*; and
      a fourth resistor having a first end *connected to* the temperature compensation bias application circuit and having a second end that is *grounded*.

Id. at 7:17–8:24 (emphasis added). With respect to "connected to," Defendants contend the term requires a direct connection between the recited claim elements (i.e., no interposed circuit elements), whereas Plaintiff argues *either* a direct or indirect connection falls within the scope of the term. Concerning "grounded," Defendants assert the term requires connection to zero volts—i.e., an "earth ground"—while Plaintiff suggests "grounded" simply means connected to a voltage reference point of the circuit, which may or may not correspond to "earth ground."

II. GENERAL LEGAL STANDARDS

"'[T]he claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.,* 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (quoting *Innova/Pure-Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)).

As such, if the parties dispute the scope of the claims, the court must determine their meaning. *See, e.g., Verizon Servs. Corp. v. Vonage Holdings Corp.,* 503 F.3d 1295, 1317 (Fed. Cir. 2007); *see also Markman v. Westview Instruments, Inc.,* 517 U.S. 370, 390 (1996), *aff'g,* 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*).

Claim construction, however, "is not an obligatory exercise in redundancy." *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997). Rather, "[c]laim construction is a matter of [resolving] disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims . . . ." *Id.* A court need not "repeat or restate every claim term in order to comply with the ruling that claim construction is for the court." *Id.*

When construing claims, "[t]here is a heavy presumption that claim terms are to be given their ordinary and customary meaning." *Aventis Pharm. Inc. v. Amino Chems. Ltd.,* 715 F.3d 1363, 1373 (Fed. Cir. 2013) (citing *Phillips,* 415 F.3d at 1312–13). Courts must therefore "look to the words of the claims themselves . . . to define the scope of the patented invention." *Id.* (citations omitted). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.,* as of the effective filing date of the patent application." *Phillips,* 415 F.3d at 1313. This "person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Intrinsic evidence is the primary resource for claim construction. *See Power-One, Inc. v. Artesyn Techs., Inc.,* 599 F.3d 1343, 1348 (Fed. Cir. 2010) (citing *Phillips,* 415 F.3d at 1312). For certain claim terms, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves

little more than the application of the widely accepted meaning of commonly understood words." *Phillips,* 415 F.3d at 1314; *see also Medrad, Inc. v. MRI Devices Corp., 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.").* But for claim terms with less-apparent meanings, courts consider "'those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean[,] [including] the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.'" *Phillips,* 415 F.3d at 1314 (quoting *Innova*, 381 F.3d at 1116).

III. THE LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is the skill level of a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In resolving the appropriate level of ordinary skill, courts consider the types of and solutions to problems encountered in the art, the speed of innovation, the sophistication of the technology, and the education of workers active in the field. *Id.* Importantly, "[a] person of ordinary skill in the art is also a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Here, the parties proffer similar skill levels for an ordinary artisan at the time of invention. Plaintiff's expert opines that a skilled artisan "would have had (1) a bachelor's degree in electrical engineering or a similar field, and approximately two years of industry or academic experience designing or analyzing voltage-controlled oscillator circuits or (2) a master's degree or Ph.D. in electrical engineering or an equivalent field, with coursework, thesis, or dissertation work, or

research experience in voltage-controlled oscillator design." Sechen Decl., Dkt. No. 294-3 ¶ 14. According to Defendants' expert, "a POSITA would have had a minimum of a bachelor's degree in electrical engineering or a similar field, and approximately two years of industry or academic experience designing or analyzing electronic circuits." Neikirk Decl., Dkt. No. 294-4 ¶ 12. To the extent material differences exist between these proffered levels of skill, the Court need not resolve those differences to resolve the parties' disputes.

IV. THE DISPUTED TERMS

A. "connected to" (Claims 1 & 2)

Plaintiff's Construction	Defendants' Construction
Plain and ordinary; no construction needed. Alternatively, "electrically coupled to."	"connected without interposition of another circuit element" Alternatively, this term is indefinite.

The parties dispute whether this phrase requires various recited elements to be only *directly* connected to one another, or whether indirect connections also suffice. Plaintiff argues that the plain and ordinary meaning of the term includes both direct and indirect connection, Dkt. No. 294 at 4–8, and that the specification supports that meaning by describing multiple elements as "connected to" one another with other elements between them. *Id.* at 9 (citing '318 Patent at 4:34–40, 4:16–22). According to Plaintiff, two elements are "connected to" one another if current flows through them in a particular direction. *See* Dkt. No. 314 at 7 ("[A] POSITA would not look to high-level functions to determine whether one component is "connected to" another. . . . That is determined by examining whether a current path exists.").

Defendants respond with four arguments. First, both the intrinsic and extrinsic evidence support their construction. Dkt. No. 309 at 6–12. Second, Plaintiff's construction reads on the prior

art. *Id.* at 12–16. Third, Plaintiff's construction conflicts with the claim language. *Id.* at 16–19. Last, Plaintiff's construction renders the claims indefinite. *Id.* at 25–27.

While the Court agrees "connected to" in isolation includes both direct and indirect connection, the specificity in these claims and the disclosure about the arrangement of elements supports Defendants' construction. In each case where "connected to" appears in the claims, the claims recite not only discrete circuit components, but how their ends, collectors, drains, anodes, and cathodes relate to one another. This is not, for example, a case where two integrated circuits are described as being "connected to" one another and a skilled artisan would understand additional circuitry between the ICs is required for operation. In this context, interposed circuit elements could fundamentally change the characteristics of the circuit and potentially render it inoperable for its intended purpose. *See, e.g.*, *ICM Controls Corp. v. Honeywell Int'l, Inc.*, 256 F. Supp. 3d 173, 184 (N.D.N.Y. 2017) (concluding that where "connected" is used with drawings and descriptions that do not show or describe intervening circuitry, an "expansion of that word's construction for purposes of literal infringement would dramatically expand the scope of the claims beyond the structure discussed in the specification")[2]; *Pulse Eng'g, Inc. v. Mascon, Inc.*, No. 08-CV-0595, 2009 WL 755321, at *3–4 (S.D. Cal. Mar. 9, 2009) (reasoning that where the asserted patent used "connected to" "without an intervening object, one skilled in the art would recognize the contemplated connection would utilize standard electrical conductors such as wire or solder and not additional electrical components such as inductors or capacitors").

In addition, despite Plaintiff's assertions to the contrary, nothing in the specification shows

[2] The *ICM Controls* court further explained that, "[w]hile . . . a resistor between two components might not exclude a circuit from the scope of the patent, the argument that the differences between the claims and the accused products are inconsequential must be made through the doctrine of equivalents." *ICM Controls Corp.*, 256 F. Supp. at 201 (N.D.N.Y. 2017).

"connected to" contemplates interposing circuit elements. Instead, Plaintiff relies on three examples showing multiple elements directly connected. *See* Dkt. No. 294 at 9–10 (citing '318 Patent at 4:34–40 and referring to items 10, 11, and 12 of Fig. 1); *id.* at 11–12 (citing '318 Patent at 5:60–63 and referring to 10, 18, and 19 of Fig. 3); *id.* at 12–13 (citing '318 Patent at 5:64–67 and referring to items 11, 12, and 18 of Fig. 3). In a fourth example, the patent explains "[t]he inductor 5 and the variable-capacitance element 6 are *connected between* the other end of the phase adjustment line 4 and a ground point," *id.* at 10–11 (citing '318 Patent at 4:16–19 (emphasis added) and referring to FIG. 1), but "connected *between*" is not the disputed term.

As its last example, Plaintiff relies on an excerpt from a reference disclosed during prosecution of the underlying application (Takeshi), which describes that "a control voltage Vc1 is connected to the positive electrode side of the varactor B1 via a resistor R11." Dkt. No. 294 at 13 (quoting Dkt. No. 294-6 at 33). But this example expressly references the interposed resistor in combination with using "connected to." The '318 Patent does not include such language.

Finally, nothing in the patent suggests the applicant used current flow to define connections between circuit elements. "Current" is not mentioned in the disclosure or the claims, except to describe the effect of increasing or decreasing temperature of a transistor. *See, e.g.*, '318 Patent at 4:54–57 ("When the temperature rises during the operation of the voltage-controlled oscillator having the above-described configuration, the collector current of the bipolar transistor 11 increases to increase the voltage drop across the resistor 12."); *id.* at 6:12–15 (same). In fact, when referencing current changes, the patent refers to the "above-described configuration," the specification's description of the connected circuit elements. *See* '318 Patent at 4:55–56 (referring to *id.* at 4:9–24); *id.* at 6:13–14 (referring to *id.* at 5:60–7:11). Both claims recite the structure of the "temperature compensation bias generation circuit" clearly and succinctly, and there is no

reason to depart from that clarity in favor of Plaintiff's direction-of-current-flow interpretation.

Plaintiff relies on several cases from this Court and the Federal Circuit, but each is distinguishable. For example, in *MEMS Tech. Berhad v. I.T.C.*, 447 Fed. App'x 142, 151 (Fed. Cir. 2011), the court construed "electrically coupled" rather than "connected to." In *Opticurrent, LLC, v. Power Integrations, Inc.*, No. 2:16-CV-325-JRG, 2017 WL 1383979 (E.D. Tex. Apr. 18, 2017), the Court found the claim language was not particularly helpful and the specification implied that "connected to" would "apply[] to *both* direct and indirect connections." *Opticurrent*, 2017 WL 1383979, at *9. The claims at issue in *Opticurrent* recited the required connections at the component level rather than parts of each component.[3] And in *Charles E. Hill & Assocs., Inc. v. Abt. Elecs., Inc.*, No. 2:09-CV-313-JRG, 2012 WL 72714 (E.D. Tex. Jan. 10, 2012), the Court construed "coupled to the remote computer," which is contextually different than connections relating to discrete electronic components.

While "connected to" in isolation typically includes both direct and indirect connections, claim language is context specific. Here, the level of specificity used by the applicant in claiming the elements of the "temperature compensation bias generation circuit" excludes indirect connections between the recited ends of the circuit components. Accordingly, in the context of the '318 Patent, the Court construes **"connected to"** as "**connected without interposition of another circuit element.**"

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[3] Claim 1 of the patent at issue recited:

> A noninverting transistor switch having . . . a first terminal, a second terminal and a third terminal, said noninverting transistor switch comprising: (a) a transistor *connected to* the second and third terminals . . . (b) a voltage stabilizer *connected to* the second and third terminals, and (c) a [CMOS] inverter *connected to* the first terminal, the second terminal, said transistor and said voltage stabilizer . . . .

Opticurrent, 2017 WL 1383979, at *9 (emphasis added).

B. "grounded" (Claims 1 and 2)

Plaintiff's Construction	Defendants' Construction
Plain and ordinary; in the alternative, "electrically coupled to a voltage reference point in a circuit"	"at a point in an electrical system that has zero voltage"

The parties dispute, when ends of certain circuit elements are "grounded," whether those elements are connected to, or at an equivalent potential of, an earth ground. *See* Dkt. No. 309 at 29 (asserting "[t]he voltage of 'earth' is widely known and accepted as zero volts"). Defendants primarily rely on Fig. 2, which discloses a zero-voltage reference line. Dkt. No. 309 at 28. Defendants also rely on a dictionary definition of "ground" as "a point in an electrical system that has zero voltage." *Id.* (citing Modern Dictionary of Elecs., Dkt. 294-5 at 327) (explaining "[t]here may or may not be an actual connection to earth, but it is understood that a point in the circuit said to be at ground potential could be connected to earth without disturbing the operation of the circuit in any way").

Plaintiff contends nothing in the intrinsic record requires the ground to be limited to "zero voltage." Dkt. No. 294 at 17. In fact, according to Plaintiff, a non-zero ground is preferable for the invention to work as intended. *Id.* at 18–19; *see also* Dkt. No. 314 at 9.

The claims do not specify an earth ground or "true" zero-voltage ground. Rather, they simply require certain elements to be "grounded." Supporting this conclusion, the patent uses a "chassis ground" symbol rather than an earth-ground symbol, which is consistent with the invention being used in vehicles. *See* '381 Patent at 2:53–56 (describing that a VCO may be used for vehicle radar). A skilled artisan would therefore understand the "0V" line of Fig. 2 as a reference voltage designated as having zero voltage for the circuit, rather than "absolute" zero

voltage or earth ground. Accordingly, the Court construes "**grounded**" as "**connected to a voltage reference point in a circuit**."

On a related note, the parties raise multiple issues relating to "AC ground" and "DC ground." For example, Plaintiff contends (1) "'ground' typically is understood to come in two forms[:] 'DC ground' and 'AC ground,'" (2) "AC ground is not limited to being zero volts," and (3) "nothing in the specification precludes the recited ground from being AC ground." Dkt. No. 294 at 20. During the hearing, Defendants posited that a skilled artisan would understand a chassis ground is a direct-current ground, and thus there is no AC ground in the claimed circuit. Plaintiff, on the other hand, suggested an AC ground means no sinusoidal variation in the voltage, and that it has identified an AC ground in the accused devices. To the extent these are disputes between the parties, they did not ask the Court to address them during claim construction. The Court therefore takes no position on them, and its construction simply resolves whether "grounded" requires connection to an earth, or "true zero," ground.

V. CONCLUSION

Disputed Term	The Court's Construction
"connected to" (Claims 1 and 2)	"connected without interposition of another circuit element"
"grounded" (Claims 1 and 2)	"connected to a voltage reference point in a circuit"

The Court **ORDERS** each party not to refer, directly or indirectly, to its own or any other party's claim construction positions in the presence of the jury. Likewise, the Court **ORDERS** the parties to refrain from mentioning any part of this opinion, other than the actual positions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings in the

jury's presence is limited to informing the jury of the positions adopted by the Court.

SIGNED this 9th day of May, 2022.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE